5 (3)

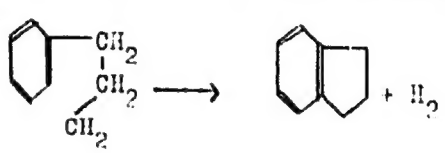
AUTHORS: Liberman, A. L., Bragin, O. V., Kazanskiy, B. A.

SOV/62-59-5-17/40

TITLE: Catalytic Cyclization of Some Alkylbenzenes into Indan and Its Homologues (Kataliticheskaya tsiklizatsiya nekotorykh alkilbenzolov v indan i yego gomologi)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk; 1959, Nr 5, pp 879-887 (USSR)

ABSTRACT: The authors showed in a number of works (Ref 1) that paraffin hydrocarbons cyclize into homologues of cyclopentane by the effect of platinized coal at moderate temperatures (310°) and a throughput rate of 0.2/hr. The cyclization is explained by intermolecular dehydrocondensation. In connection with it, the possibility was considered of cyclizing more complicated compounds, e.g. a secondary chain of a benzene homologue according to the scheme:

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Catalytic Cyclization of Some Alkylbenzenes Into Indan and Its Homologues SOV/62-59-5-17/40

Some data on a similar cyclization are quoted from publications: Crchin (Ref 2), patent date (Ref 3), Zelinskiy and Tits (Ref 4) etc. Table 1 shows a comparison of the constants of the initial products and the cyclized compounds with the corresponding data from publications. The conditions of synthesis were equal to those of the cyclization of paraffins. Indan and 1- and 2-methylindan were obtained from n-butyl-, secondary butyl- and isobutyl benzene. Methylindan was brominated and the compounds 4,5,6,7-tetrabromo-2-methylindan and 2,4,5,6,7-pentabromo-1-methylindan not yet described in the literature were synthesized. The synthesis of the individual compounds is described in the experimental part. The R. and W. Meyer method was used in the bromination of tribromoindan (Ref 17). The properties and yield of the various cyclized compounds are summarized in tables 2,3,4,5, 6, and 7. There are 1 figure, 7 tables, and 18 references, 9 of which are Soviet.

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Catalytic Cyclization of Some Alkylbenzenes Into Indan and Its Homologues SOV/61-59-9-17/40

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: July 30, 1957

Card 1/3

5 (3)

AUTHORS: Kazanskiy, B. A., Liberman, A. L., Loza, G. V., Kuznetsova, I. M., Aleksanyan, V. T., Sterin, Kh. Ye.

SOV/62-59-6-19/36

TITLE: Catalytic Cyclization of n-Octane With Formation of the Homologs of the Cyclopentane (Kataliticheskaya tsiklizatsiya n. oktana s obrazovaniyem gomologov tsiklopentana)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 6, pp 1071 - 1078 (USSR)

ABSTRACT: By the action of a platinum catalyst n-octane forms the cyclic compounds: 1-methyl-2-ethylcyclopentane and n-propylcyclopentane. The present investigation dealt with the cyclization process and the spatial structure of the compounds produced by cyclization. For the purpose of this cyclization n-octane was for five hours passed through platinated coal with a passage rate of 0.2/hour at 310°. Two samples of the catalyst were used in parallel. In contrast to ramificated isomers cyclization of n-octane is fairly difficult. The yield on both catalysts was only 2.2 and 4.5%, respectively. The cyclic product could be enriched by distilling the catalysate. An investigation by means of the Raman spectrum showed that there was trans-1-methyl-2-

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ethylcyclopentene in the lower boiling fraction, and n-propylcyclopentene in the residue. The cis-form of the first mentioned compound could not be discovered. Apart from the compounds mentioned, there were still small quantities of 4-methylheptane to be observed. Furthermore, a line (762 $cm^{-1}$) was discovered, which was assigned to the pentalane bicyclo-[0,3,3]-octane. This could, however, not yet be proved owing to the difficulties that arise in the production of the pentalane. Since the Raman spectra of the two cyclic compounds obtained are yet hardly known, the single compounds were synthetized in pure form and plotted separately. The synthesis was carried out according to a method which was worked out in the institute mentioned in the Association, with the only difference that instead of aluminum oxide, silica gel was used for isomerisation. In the experimental part the production of the different substances is described in detail. The properties of and the yield in catalysates, obtained from n-octane, are compiled in table 1. Table 2 gives the data concerning the substances produced by distillation. When analyzing the catalysates, distillates,

Catalytic Cyclization of n-Octane With Formation of the Homologs of the Cyclopentane SOV/62-59-6-19/36

and residues from n-octane it is shown that about the same portions are obtained for both compounds. There are 2 tables and 12 references, 10 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR i Komissiya po spektroskopii Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR, and Committee for Spectroscopy of the Academy of Sciences, USSR)

SUBMITTED: August 15, 1957

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KAZ AUSKAY, B.A.

SOV/81-7-2-9/24

AUTHORS: Aleksanyan, V.T., Aterin, Kh.Ye., Latina, Z.Ya., Lifshets, L.L. and Kazanskiy, B.A.

TITLE: A Spectroscopic Investigation of the Effect of Mutual Orientation of Cyclopropane and Phenyl Rings on their Conjugation (Spektroskopicheskoye issledovaniye vliyaniya vzaimney ortiyentatsii tsiklopropanovykh i fenil'nykh kolets na ikh sopryazheniye)

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 2, pp 178-186 (USSR)

ABSTRACT: The paper describes results of the study of Raman spectra of stereoisomers of 1,2-diphenylcyclopropane and 1-phenyl-2-cyclopropylcyclopropane. These hydrocarbons were prepared following the technique described by Kishner (Ref 4) and Smith and Rogier (Ref 16). Stereoisomers were separated out by fractional distillation under vacuo. The Raman spectra were recorded by means of a spectrograph ISP-51. The frequencies and intensities were measured following a technique described earlier (Ref 17). The frequency scatter did not exceed 21 $cm^{-1}$ and the intensity scatter was ± 10%. The integral intensities were determined by direct microphotometry of the line shape. The 802 $cm^{-1}$ line in the spectrum of cyclohexane was used as a standard and its molar integral intensity was taken to be 500. The

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results obtained are tabulated on pp 180-1. The intensities of the lines at ~1200 and ~1600 $cm^{-1}$ of the two compounds studied were stronger than those of alkyl benzenes; this indicates a strong conjugation of cyclopropane and phenyl rings. The conjugation is shown less clearly in the spectra of stereoisomers with lower boiling points. This is due to steric obstacles which prevent the most favourable arrangement of the phenyl rings with respect to the cyclopropane ring. Such steric obstacles exist only in cis-isomers. This circumstance was used to identify the cis- and trans-isomers of both hydrocarbons. For 1,2-diphenylcyclopropane the isomer with a boiling point of 131.6-131.7°C (4.8 mm Hg) and a freezing point of 34.7°C was identified as the cis-form, while the isomer with a boiling point of 144.1-144.2°C (8.2 mm Hg) and a freezing point of 15.5°C had the trans-form. The cis-isomer of 1-phenyl-2-cyclopropylcyclopropane had a boiling point of 100.2-100.5°C (at 11 mm Hg) and the trans-isomer

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boiled at 111.3-111.5°C (at 13.4 mm Hg). There are 2 figures, 2 tables and 21 references, 9 of which are Soviet, 8 English, 1 French, 1 German, 1 translation from English into Russian and 1 from an international journal.

SUBMITTED: September 23, 1958

Card 3/3

BLONSKAYA, A.I.; LOZOVOY, A.V.; GAVRILOVA, A.Ye.; GONIKBERG, M.G.; KAZANSKIY, B.A.

Investigating hydrogenation of lean coals and anthracites with a hydrogen pressure greater than 1000 atm. Trudy IGI 9: 50-61 '59. (MIRA 13:1)

(Coal liquefaction)

MEL'NIKOV, N.N.; SUKHAREVA, N.D.; RODIONOV, V.M., [deceased], akad., red.; KAZANSKIY, B.A., red.; KNUNYANTS, I.L., akad., red.; SHEMYAKIN, M.M., akad., red.; MEL'NIKOV, N.N., prof., red.; YEVDAKOV, V.P., red.; ZASUL'SKAYA, V.F., tekhn.red.

[Organic reactions and methods of investigating organic compounds] Reaktsii rodanirovaniia organicheskikh soedinenii. Moskva, Gos.nauchn.-tekhn.izd.-vo khim.lit-ry, 1959. 446p. (Reaktsii i metody issledovanii organicheskikh soedinenii, vol.8). (MIRA 13:2)

(Thiocyanation) (Organic compounds)

5 (4)

AUTHORS: Kazanskiy, B. A., Landsberg, G.S. (Deceased), SOV/62-59-9-15/40
Aleksanyan, V. T., Bulanova, T. A.,
Liberman, A. L., Mikhaylova, Ye. A., Plate, A. F., Sterin, Kh.Ye.,
Ukholin, S. A.

TITLE: Investigation of the Composition of the Fraction With a Boiling Point Between 150 and 250° of the Emba Crude Petroleum

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 9, pp 1612 - 1622 (USSR)

ABSTRACT: An attempt is being made to apply the combined investigation method for benzines (Ref 1) to the investigation of the petroleum fraction with a boiling point between 150 and 250° of the Emba crude petroleum. The petroleum investigated came from the Koschagylskoye deposit. It was proved that this fraction contains 12.6% of aromatic and 13.0% of hexahydroaromatic hydrocarbons. In the aromatic fraction 29 different hydrocarbons were identified. The quantitative division in groups of the aromatic hydrocarbons boiling in this range was carried out with characterization of the arrangement of the side-chains on the benzene ring or the corresponding cyclohexane ring and that for the multicyclic according to the arrangement of the rings. By this method

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the authors succeeded in establishing the composition of the aromatic compounds up to 70% and that of the hydroaromatic compounds up to 46%. In the paraffin-naphthene part of the fraction the presence of naphthene with two different substituents in the same carbon atom of the cyclohexane could be established (mixed substitution). The limiting into narrower fractions was possible at the paraffin-naphthenes by investigating the specific gravities, the refractive index and the aniline point of these fractions. In figures 1 and 2 the paraffin-naphthene fractions are identified and tables 1-6 contain the results of the analysis. Table 7 gives the results of the distillation of the paraffin-cyclopentane fraction of the Ligroin applying the coefficient proposed by P. S. Maslov (Ref 11). There are 2 figures, 7 tables, and 11 references, 10 of which are Soviet.

Investigation of the Composition of the Fraction With a Boiling Point Between 150 and 250° of the Emba Crude Petroleum SOV/62-59-9-15/40

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR). Komissiya po spektroskopii Akademii nauk SSSR (Committee of Spectroscopy of the Academy of Sciences, USSR)

SUBMITTED: January 4, 1958

Card 3/3

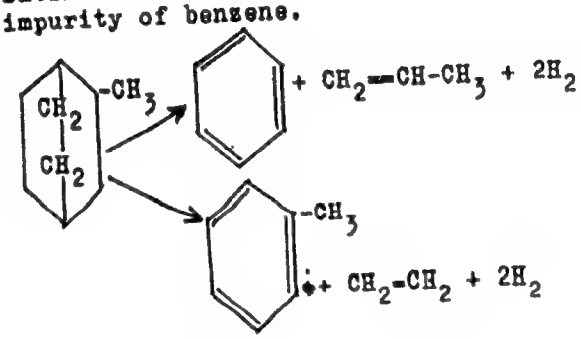
5 (3), 5 (4) SOV/79-29-8-27/91

AUTHORS: Kazanskiy, B. A., Svirskaya, P. I.

TITLE: Synthesis and Catalytic Transformations of 2-Methylbicyclo-(2,2,2)-octane and 2,3-Dimethylbicyclo-(2,2,2)-octane

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 8, pp 2584 - 2587 (USSR)

ABSTRACT: Previously, B. A. Kazanskiy and A. Plate (Ref 1) showed that the 2-methylbicyclo-(2,2,2)-octane is transformed, in the presence of platinized carbon at 300-310°, to give toluene with a small impurity of benzene.




Card 1/2

Synthesis and Catalytic Transformations of 2-Methyl- SOV/79-29-8-27/81
bicyclo-(2,2,2)-octane and 2,3-Dimethylbicyclo-(2,2,2)-
octane

In order to carry out a more thorough investigation of this reaction, the authors synthesized anew the 2-methylbicyclo-(2,2,2)-octane and the 2,3-dimethylbicyclo-(2,2,2)-octane hitherto not yet described in publications and carried out the catalytic transformations of these hydrocarbons under the conditions mentioned. The two octanes were found to behave differently: The 2-methylbicyclo-(2,2,2)-octane is nearly completely converted into aromatic hydrocarbons among which the toluene is predominant, whereas benzene occurs in traces only; from 2,3-dimethylbicyclo-(2,2,2)-octane only 30% are transformed into a mixture of benzene (about 1/3) and o-xylene (about 2/3) under the same conditions (Scheme 2). Both resultant octanes are gaseous saturated hydrocarbons. There are 2 tables and 3 references.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk SSSR (Institute of Organic Chemistry of the Academy of Sciences, USSR)

SUBMITTED: July 5, 1958

Card 2/2

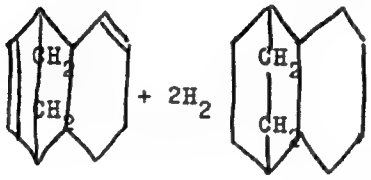
5(3) SOV/79-29-8-28/81

AUTHORS: Kazanskiy, B. A., Svirskaya, P. I.

TITLE: 1,4-Endoethylene-5,6,7,8-tetrahydro-naphthalene

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 8, pp 2588 - 2591 (USSR)

ABSTRACT: B. A. Kazanskiy and L. G. Vol'fson showed (Ref 1) that the dimer of cyclohexadiene-1,3, the endoethylene-hexahydro-naphthalene and its dihydro-derivative, the endoethylene-octahydro-naphthalene, are transformed into a crystalline hydrocarbon with the melting point 63-64°, under escape of hydrogen. The present paper shows that the tetrahydro-derivative of the dimer, the endoethylene-decahydro-naphthalene (Alekseyevskiy, Ref 2) can easily be obtained according to the scheme




by hydrogenation under pressure at usual temperature, and is converted under the conditions mentioned [in the presence of platinized carbon at 240-250° (Ref 1)] to give the

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same hydrocarbon with the melting point 63-64°. Thus all endoethylene-hydro-naphthalenes are capable of transformations according to scheme 2 on dehydrogenolysis. The end product is stable up to 320° in the presence of platinized carbon. At 350° (Ref 1) some naphthalene was formed which could, however, not be separated. The formation of naphthalene suggests that the reaction proceeds according to scheme 3, just as in various octanes (Ref 3). It can be seen from the present paper that the endoethylene-tetra- and endoethylene-decahydro-naphthalene is nearly completely transformed into naphthalene at 400°, which can be regarded as a proof of the assumed structure of the hydrocarbon melting at 63-64°. On the other hand, the molecule of the endoethylene-tetrahydro-naphthalene was found to contain an aromatic nucleus, since a number of products were obtained in which the hydrogen is substituted as in aromatic compounds. Thus, for instance, the mononitro-derivative could be formed with the nitro-group in position 5, which further yielded azo-dyes by reduction, diazotization and coupling. The structure of the nitro compound was confirmed by oxidation to phthalic acid (I), without yielding compound (II) possible at the same time. All these experiments show that the above-

1,4-Endoethylene-5,6,7,8-tetrahydro-naphthalene SOV/79-29-8-28/81

mentioned hydrocarbon with the melting point 63-64° represents the 1,4-endoethylene-5,6,7,8-tetrahydro-naphthalene. There are 6 references, 4 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk SSSR (Institute of Organic Chemistry of the Academy of Sciences, USSR)

SUBMITTED: July 5, 1958

Card 3/3

5(3) SOV/79-29-9-36/76

AUTHORS: Kazanskiy, B. A., Svirskaya, P. I.

TITLE: Synthesis of Bicyclo-(2,2,2)-octane and 2-Methyl-3-ethyl Bicyclo-(2,2,2)-octane

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 9, pp 2976-2977 (USSR)

ABSTRACT: Bicyclo-(2,2,2)-octane was already synthesized by several authors (Refs 1-3). The 2-methyl-3-ethyl bicyclo-(2,2,2)-octane has, however, hitherto not been described in publications. The authors synthesized these compounds by way of pyrolysis of acetates of the corresponding alcohols and by hydrogenation of the resulting unsaturated hydrocarbons. The pyrolysis of acetates is known to proceed at 400-500° without isomerization of the skeleton of the initial compound and yields hydrocarbons of the desired structure. The authors were interested in finding the behavior of the derivatives of bicyclo-(2,2,2)-octane under these conditions, which are capable of separating one of the intermediate bridges of bicyclooctane. It was thus possible to synthesize bicyclo-(2,2,2)-octane with properties corresponding to those described in publications. This indicates that 2-methyl-3-ethyl bicyclo-(2,2,2)-octane, which was newly obtained by the

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SOV/79-29-9-36/76

Synthesis of Bicyclo-(2,2,2)-octane and 2-Methyl-3-ethyl Bicyclo-(2,2,2)-octane

authors, has also the structure suggested by them. The synthesis of bicyclo-(2,2,2)-octane proceeds according to scheme 1 and that of 2-methyl-3-ethyl bicyclo-(2,2,2)-octane according to scheme 2. The experimental part provides more details. There are 4 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: July 5, 1958

Card 2/2

5(3)

AUTHORS: Yelagina, N. V., Kazanskiy, B. A., Academician

SOV/20-124-5-25/62

TITLE: The Synthesis of Spiro-(5,6)-dodecane (Sintez spiro-(5,6)-dodekana)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 5, pp 1053-1056 (USSR)

ABSTRACT: In former communications, the first author described the synthesis of several cyclic hydrocarbons with a quaternary carbon atom in the cycle (Refs 3,4). They were obtained by means of the pinacoline rearrangement from bitertiary α-glycols. The ketones thus procured were changed into hydrazones, the latter catalytically decomposed according to N. M. Kizhner. The above-mentioned reaction was used in this paper for the synthesis of the above-mentioned bicyclic hydrocarbon with spiran structure (I). For this purpose cyclohexanone was reduced with amalgamated aluminum in dry benzene and yielded 1,1'-dioxy-1,1'-dicyclohexyl (II). Pinacol turned by the action of 63 % sulphuric acid into a mixture of 30 % spiro-(5,6)-dodecanone-7 (III) and 70 % 1,1'-dicyclohexenyl (IV). Neither strongly nor weakly concentrated $H_2SO_4$ led to the proper result as the

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reaction products in the first case were resinified, while weakly concentrated $H_2SO_4$ acted mainly in a dehydrating manner and first of all led to 1,1'-dicyclohexenyl (IV). The ketone- (III) and diene- (IV) mixture was subjected to fractional distillation in vacuum; the fractions enriched with spiro ketone were treated with hydrochloric acid semicarbazide. The spiro-(5,6)-dodecanone-7-semicarbazone was decomposed by hydrochloric acid and the ketone was distilled off with steam. Through the action of hydrazine hydrate on spiro-(5,6)-dodecanone-7 (III) hydrazone (V) was synthesized; it was decomposed in the presence of caustic potash and platinated carbon. The final product obtained as mentioned in the title is a rather dense, colorless liquid with a pleasant camphor smell. Its constants are given and the usual data are furnished in an experimental part. There are 12 references, 7 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: November 24, 1958

SOV/20-124-6-17/55

5(7)

AUTHORS: Yelagina, N. V., Stabnikova, T. V., Kazanskiy, B. A., Academician

TITLE: Synthesis of 6,9-Endomethylene-Spiro-(4,5)-Decane (Sintez 6,9-endometilenspiro-(4,5)-dekana)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 6, pp 1243 - 1246 (USSR)

ABSTRACT: By means of the diene-condensation of 2-methylene cyclohexanone-1 with cyclopentadiene an unsaturated spirane ketone- 1,4-endomethylene-spiro-(5,5)-undecene-2-one-7 (I) is formed (Ref 1). This compound was transformed into a tricyclic spirane hydrocarbon-1,4-endomethylene-spiro-(5,5)-undecane (II). In the present paper the authors used the initially mentioned diene-condensation for the synthesis of another representative of the substance (III) mentioned in the title. By means of the reaction of 2-methylene-cyclopentanone-1 (IV) with cyclopentadiene (V) an unsaturated spirane ketone was produced: 6,9-endomethylene-spiro-(4,5)-decene-7-one-1 (VI). As 2-methylene cyclopentanone-1 (IV) tends to polymerize, the Mannich-base (Mannikh) was introduced into the reaction, i.e. 2-(N-dimethyl

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Synthesis of 6,9-Endomethylene-Spiro-(4,5)-Decane SOV/20-124-6-17/55

aminomethyl)-cyclopentanone-1 (VII) which in the course of reaction decomposed into 2-methylene-cyclopentanone-1 and a secondary amine. By means of the catalytic dehydrogenation of the ketone (VI) in the presence of Raney nickel at a low temperature 6,9-endomethylene-spiro-(4,5)-decanone-1 (VIII) was produced. By the action of hydrazine hydrate (VIII) was transformed into hydrazone (IX). The latter was catalytically decomposed according to N. M. Kizhner. The substance obtained as mentioned in the title is a colorless, mobile liquid, with a terpene-like smell and with a boiling point of 83°/12 mm. The experimental part furnishes the usual data. There are 2 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: December 3, 1958

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SOV/20-126-3-31/69

5(3)

AUTHORS: Kazanskiy, B. A., Academician, Rozengart, M. I., Kuznetsova, Z. F.

TITLE: Destructive Alkylation of Benzene by Propane (Destruktivnoye alkilirovaniye benzola propanom)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 3, pp 571 - 574 (USSR)

ABSTRACT: The reaction of paraffin hydrocarbons with aromatic hydrocarbons can open new ways to the production of various aromatic substances, and contribute to clarify the nature of catalytic transformations. But it belongs to the most poorly investigated branches of hydrocarbon chemistry. Patents (Refs 1,2) show that benzene is alkylated by paraffin hydrocarbons in the presence of hydrogen fluoride, boron fluoride, as well as their mixtures. The patents state that only such paraffins are suitable which possess no less than 5 carbon atoms in the chain. On the basis of references 4-9, it was to be expected that toluene would originate by the interaction of benzene with different paraffin hydrocarbons under pressure and in the presence of nickel catalysts. Preliminary experiments by the authors have confirmed this expectation, for it came true with normal paraffin hydrocarbons (heptane, hexane, butane, propane) at a much lower pressure (60 atmospheres overpressure) than indicated in refer-

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ence 6. The said reaction of benzene with propane was closely investigated by the authors on nickel deposited on siliceous earth. Table 1 shows the yields of "alkyl benzenes", table 2 the influence of temperature on this yield. Table 3 indicates the influence of the duration of test on the activity of the catalyst. Figures 1 and 2 show the fractionation curves of the catalyzates. There are 2 figures, 3 tables, and 11 references, 2 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences,USSR)

SUBMITTED: March 11, 1959

5(2) SOV/20-126-4-27/62

AUTHORS: Kazanskiy, B. A.; Academician, Rozengart, M. I.; Kuznetsova, Z. F.

TITLE: The Effect of Some Admixtures of Alkali Elements on the Properties of Aluminum-chromium Catalysts (Vliyaniye dobavok shchelochnykh elementov na kataliticheskiye svoystva alyumo-khromovykh katalizatorov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 4, pp 787-790 (USSR)

ABSTRACT: As is known, the admixture of small amounts of potassium and cesium to the catalysts mentioned in the title, increases the output of final products in the reaction of aromatizing paraffin hydrocarbons (Ref 1). In publications however, there are no reliable statements on a similar effect of other alkaline elements. The present article is dedicated to the latter problem. A description follows of the effects of equivalent amounts of Li, Na, K, Rb and Cs on the activity of two preparations A and B of the mentioned catalyst, in the reaction of dehydrogenation of n-heptane at 520°. Lithium is ineffective for the increase of the output of aromatic products of heptane. The introduction of sodium however, raises

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the output in both catalysts by 8%. This promoting effect still increased with potassium (13 and 11%), and reached its maximum with rubidium (21 and 15%), for cesium it was 9 and 13%. The same was observed in the dehydrogenation of cyclohexane with A and B. There is a great similarity between the effect mentioned above and that of the same admixtures to catalysts of iron magnesium (Ref 3). If alkali elements are added to the catalysts mentioned in the title, the output of the catalyst increases, i.e. the cracking of hydrocarbons decreases. This gives reason to the opinion that there are active centres in the catalyst concerned which catalyze reactions of cracking and of the polymerization of unsaturated hydrocarbons. In their course they develop carbonium ion, similar to the classical case of the catalyst aluminum silicate. Such an admixture of alkali elements apparently reduces the "coke" sediment on the catalyst and thus increases the stability of the latter (Ref 4). It is to be expected that the application of alkali elements will reduce the temperature of regeneration in the catalyst. This would increase the stability of the latter, and extend the duration of their application. On the

SOV/20-126-4-27/62

The Effect of Some Admixtures of Alkali Elements on the Properties of Aluminum-chromium Catalysts

other hand, the thermal stability of the catalyst is reduced by alkali (Ref 4). The role of this one part of the effect of alkali cannot be explained sufficiently. There are 2 figures, 2 tables, and 6 references, 3 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR
(Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: April 13, 1959

Card 3/3

5 (3)

AUTHORS: Kazanskiy, B. A., Academician, Gostunskaya, I. V., Leonova, A. I.

SOV/20-126-6-33/67

TITLE: Catalytic Hydrogenation of Diene Hydrocarbons With an Isolated System of Double Bonds in the Presence of Platinum and Palladium (Kataliticheskoye gidrirovaniye diyenovykh uglevodorodov s izolirovannoy sistemoy dvoynykh svyazey v prisutsvii platiny i palladiya)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 6, pp 1264 - 1267 (USSR)

ABSTRACT: The authors were interested in investigating the behaviour of the dienes mentioned in the title in the case of an incomplete hydrogenation. The mono-olefins yield, in the liquid phase, in the presence of Pd, new mono-olefins which are formed by the shifting of the double bonds in the initial hydrocarbon (Refs 1,2). Platinum does not have this effect (Refs 2,3). These two catalysts have the capability of catalyzing the hydrogen addition to unsaturated compounds, they behave, however, in a different way in hydrogenation. As is known, the dienes mentioned may be isomerized into dienes with a conjugate system of double bonds in the case of a heterogeneous catalysis at temperatures

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Catalytic Hydrogenation of Diene Hydrocarbons With an Isolated System of Double Bonds in the Presence of Platinum and Palladium SOV/20-126-6-33/67

above 200° in the presence of Pr and Pd (Ref 4). In the present paper the following was used as investigation object: a) hexadiene-1,5 (di-allyl); b) 2-methyl-hexadiene-2,5; c) 2-methyl-hexadiene-1,5 and d) 2,5-dimethyl-hexadiene-1,5 (di-isobutenyl). Half of a hydrogen molecule was added to these compounds at room temperature in the presence of Pt and Pd; in each of these cases a mixture of equal amounts of mono- and diolefin was expected to be formed. It was found, however, that in the case of a partial hydrogenation of hexadiene-1,5 in the presence of platinum not only hexene-1 but also n-hexane had formed in the reaction products apart from diallyl which did not enter the reaction (see scheme). In the presence of palladium the hydrogenation product consisted of hexene-1 and of hexene-2 which is isomeric with respect to hexene-1; besides hexadiene-1,5 which did not enter the reaction, the product of its isomerization, hexadiene-1,4 was found. n-hexane however, was lacking. It must be emphasized that in the hydrogenation products of diallyl with palladium the diene with a conjugate double bond system expected, was not found. Also the

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hydrogenation products of the substances mentioned under c) and d) contained no conjugate dienes. i.e. in these cases only one of the double bonds was shifted. In contrast to the 1,5-dienes, 2-methyl-hexadiene-2,5 was isomerized under the same conditions into a diene with one conjugate double bond system to about 15%. Apparently the lacking of the conjugate dienes in the hydrogenation of the 1,5-dienes with palladium may be explained by an unfavorable interrelation of the reaction rates of hydrogenation and isomerization on the palladium surface. Conclusions concerning the connection between the structure of the compound to be hydrogenated and the hydrogen addition rate must, however be drawn very carefully. The shifting of the double bond may influence the addition kinetics of the hydrogens during the hydrogenation with palladium. For this reason these possible complications must be taken into account. There are 3 figures, 6 tables, and 6 references, 4 of which are Soviet.

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Catalytic Hydrogenation of Diene Hydrocarbons With an Isolated System of Double Bonds in the Presence of Platinum and Palladium SOV/20-126-6-33/67

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 18, 1959

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5 (3) SOV/20-127-2-29/70

AUTHORS: Lukina, M. Yu., Zotova, S. V.; Kazanskiy, B. A., Academician

TITLE: Catalytic Transformation of Alkyl Cyclopropanes in the Presence of Platinum and Palladium Applied to Ashless Activated Charcoal

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 2, pp 341-344 (USSR)

ABSTRACT: The authors showed recently (Ref 1) that the hydration of alkyl cyclopropanes in the presence of platinized charcoal differs from the hydration in the presence of palladium applied to charcoal (see Scheme). In the first case and at 120° as well as at 220° only the hydrogenolysis of the three-membered ring takes place, in the second case, however, the isomerization of the alkyl cyclopropane to olefines with a subsequent hydrogen addition to the latter proceeds besides the above-mentioned reaction. The quantity of the products of the side reaction increases up to 40 % with the temperature rise up to 220°. This side reaction proceeds either on the account of palladium or charcoal, if palladium is able to cause an isomerization of the three-membered ring in contrast to platinum (first case). The second case is as well possible, since the charcoal does not remain inert (according to Ref 2) in this reaction. If this last assumption is right, it

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cannot be explained why these properties of the charcoal do not appear in the case of the platinum catalyst; or it is a consequence of the lower palladium activity in the hydrogenolysis reaction, as the authors assumed earlier (Ref 1). Thus it was the authors' object to investigate and compare the properties of these two metals themselves. This should be the case in the isomerization and hydrogenolysis of the alkyl cyclopropanes under elimination of the effect of the carrier. The charcoal mentioned in the title was used since the platinum- and palladium blackness did not cause at all an alkyl cyclopropane analysis at 120°. The charcoal was produced by the carbonization of sugar. The cyclopropanes were not subjected to any changes in the case of a passage through such a charcoal at 220°. Pt- and Pd-catalysts of 20 % were produced on the basis of this charcoal. The isomerization (in the absence of hydrogen) was carried out at 220°. This temperature was assumed as optimum temperature in the previous papers of the authors (Refs 1-3). Now neither the properties of the alkyl cyclopropanes were changed nor the catalysates contained unsaturated compounds. Thus it was proved that neither Pt nor Pd isomerize under these conditions the three-membered ring.

Catalytic Transformation of Alkyl Cyclopropanes in the Presence of Platinum and Palladium Applied to Ashless Activated Charcoal SOV/20-127-2-29/70

1,1,2-trimethyl-cyclopropane was used for experiments in the presence of hydrogen. The hydration on the mentioned catalyst is not complete at 120°. This makes possible a comparison of their activity. It was found that no isomerization had occurred. The hydrogenolysis proceeded on platinum with 65 %, on palladium with 50 %. Thus the latter turned out to be less active. Thus it was confirmed that in the case of palladium the isomerization is caused by the carrier, not by the metal. The differences in the effect of the two metals in the hydration depend on their individual activity. The hydrogenolysis rate surpasses in the case of the more active metal that of the isomerization caused by the carrier to such an extent that the influence of the latter is not expressed at all. The two reaction rates compete with each other in the case of the less active metal and the side reaction caused by the carrier proceeds besides the hydrogenolysis. There are 1 figure, 3 tables, and 5 references, 4 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

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5(3)

SOV/20-127-3-24/71

AUTHORS: Lukina, M. Yu., Nakhapetyan, L. A., Ovodova, I. A., Kazanskiy, B. A., Academician

TITLE: Catalytic Isomerization of Hydrocarbons in the Cyclobutane Series

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 3, pp 567 - 570 (USSR)

ABSTRACT: Up to now only few papers have existed on the subject mentioned in the title (Refs 1-6). The mentioned papers neither give an exhausting idea of the conditions necessary for the isomerization of a cycle with 4 links, nor of the reaction products. This fact made the authors start a systematic investigation of the mentioned field. They investigated the hydrocarbons mentioned in the title, in the presence of catalysts which usually isomerise a cycle with 5 links, under conditions which allow a comparison of the resistances of carbon cycles with 5 and 4 links. Already in former investigations the authors faced an interesting phenomenon: alkyl-cyclobutanes (Ref 7) in contrast to alkyl-cyclopropanes (Ref 8), experienced no isomerization with a chromatographic adsorption on silica gel. Isopropenyl-cyclobutane, however,

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KAZANSKIY B.A.

was completely isomerized with an expansion of the cycle to 5 links (Ref 9). The behavior of alkyl-cyclobutanes thus differed already from that of an alkenyl-cyclobutane which even proved less resistant than alkyl-cyclopropanes. In this connection the authors investigated the behavior of saturated hydrocarbons: ethyl- and iso-propyl-cyclobutane, also with acid catalysts (such as silica gel), furthermore with unsaturated hydrocarbons of the same series with a different position of the double linkage in the substituent, i. e. isopropenyl-cyclobutane and isopropylidene-cyclobutane. In doing so they found that aluminosilicate can completely isomerise alkyl-cyclopropane at 50° (Ref 10), and does not cause a noticeable isomerization of iso-propyl-cyclobutane, not even at 250°. Siliceous earth which completely isomerises alkyl-cyclopropane at 75° (Ref 10), does not influence alkyl-cyclobutane between 150° and 400°; only at 500° the catalyzation product obtained differed considerably from the initial hydrocarbon, as far as its constant is concerned. A fact which can also be explained by the high temperature. Thus it was

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proved that alkyl-cyclobutanes, in contrast to alkyl-cyclopropanes are enough resistant under the conditions of isomerization. Also here the unsaturated hydrocarbons of the cyclobutane series behaved in quite a different way: isopropenyl-cyclobutane was completely isomerized in the presence of siliceous earth, already at a temperature of 200°, with an extension of its cycle to 5 links. In the Raman spectrum the hydrated isomerization product appeared as a mixture of 1,2-dimethyl-cyclopentane with traces of 1,1-dimethyl-cyclopentane. Isopropylidene-cyclobutane developed a similar isomerization product. Thus it was proved that unsaturated hydrocarbons of the cyclobutane series could easily be isomerized independently of the position of the double linkage in the substituent. They developed the same products under conditions which could not effect the alkyl-cyclobutanes. The catalysts investigated are able to cause a displacement of the double linkage (Ref 11). This is explained by the scheme. There are 1 table and 11 references, 9 of which are Soviet.

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ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry Imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: April 27, 1959

5 (2, 3) SOV/20-127-6-23/51

AUTHORS: Kazanskiy, B. A., Academician, Rozengart, M. I., Kuznetsova, Z. F.

TITLE: The Effect of Added Elements of the 2nd Group of the Periodic System Upon the Activity of Aluminum-chromium Catalysts in Aromatization

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 6, pp 1228-1230 (USSR)

ABSTRACT: In the present paper, the authors proved that the elements mentioned in the title (except for Hg which was not tested) favor th aromatization of cyclohexane. This effect increases with the increasing atomic weight from Be to Ba. The said effect was weaker in the dehydrocyclization of n-heptane. Only the alkaline earth metals exhibited it. An addition of Be, Mg, and Zn had practically no effect on the activity of the catalyst; an additic of cadmium even reduced it slightly. The experiments with cyclohexane were carried out twice through 4 hours each; the catalyst was regenerated after each experiment. The temperature was 520°, the volume velocity was 0.35 $h^{-1}$ per volume unit. Table 1 indicates the results obtained. It shows that the yield in aromatic substances on the beryllium-containing sample rose

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The Effect of Added Elements of the 2nd Group of the Periodic System Upon the Activity of Aluminum-chromium Catalysts in Aromatization SOV/20-127-6-23/51

by 5%, with magnesium by 5.5, with calcium by 10, with strontium by 13, and with barium by 17.6%. The results obtained with n-heptane (temperature 530°, volume velocity as above) are shown in table 2. It shows that the effect of all said elements in the dehydrocyclization of n-heptane was much weaker than above. The yields in unsaturated compounds were small in the aromatization of cyclohexane (0.4-2.6%, Table 1). There are 1 figure, 2 tables, and 2 Soviet references.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: June 5, 1959

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5.(3) SOV/20-128-1-26/58

AUTHORS: Rudenko, A. P., Kazanskiy, B. A., Academician

TITLE: Heterogeneous-catalytic Course of Benzene Pyrolysis Reactions

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 1, pp 99-102 (USSR)

ABSTRACT: The present paper investigates the role played by the contact surface during benzene pyrolysis especially in the formation of diphenyl as well as the specificity of different contacts. The enlargement of the contact surface had positive results and led to the conclusion that the reaction is of heterogeneous catalytic character (Table 1). In the investigation of the specificity of individual catalysts a number of applied catalysts - such as metal on silica gel - were employed (Table 2). The specificity of the catalysts investigated indicates a marked distinction (Figures 1 and 2). On the basis of the results obtained the kind of contact during pyrolysis is not all unimportant as was sometimes assumed (Refs 4 and 5). It determines the marked peculiarities of the specificity of contacts and their catalytic activity with respect to individual reactions of the dehydrocondensation of benzene. The manifestation of the specificity of contacts speaks also for a heterogeneous catalytic

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mechanism of the benzene pyrolysis. The physical changes of contact surfaces must also be pointed out; they only take place in the reaction zone and cannot be observed in an inert medium (nitrogen) on simple heating. It may be assumed that due to the heterogeneous catalytic character of the diphenyl formation the migration of atoms and atomic groups of the contact is facilitated by the formation of catalytic complexes. There are 2 figures, 2 tables, and 14 references, 7 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: May 26, 1959

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SOV/20-128-6-29/60

5 (3) 5.3300

AUTHORS: Kazanskiy, B. A., Academician, Liberman, A. L., Loza, G. V., Vasina, T. V.

TITLE: Parallel Formation of Five- and Six-membered Cycles of Paraffins ($C_5$- and $C_6$-Dehydrocyclization) on Platinized Charcoal

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 6, pp 1188 - 1191 (USSR)

ABSTRACT: Three different possibilities of cyclization of paraffins have become known: a) Dehydrocyclization with a direct formation of aromatic hydrocarbons (B. A. Kazanskiy and A. F. Plate, Ref 1); b) conversion into a corresponding cyclohexane hydrocarbon; c) aromatization of the compound formed as under b). Since 1954 (Refs 5,6) it has been known that besides aromatic hydrocarbons also the corresponding cyclopentane homologa are formed on platinized charcoal from n-heptane and n-octane. They were particularly formed from branched paraffins with 5 C-atoms in the principal chain (Refs 7-9). The formation mechanism had to be more complicated here: either an isomerization with formation of a longer chain had taken place before, or the aromatization mentioned under c) had occurred. The former assumption is li

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S/081/60/000/022/002/016
A005/A001

Translation from: Referativnyy zhurnal, Khimiya, 1960, No. 22, pp. 174-175, # 88528

AUTHORS: Kazanskiy, B. A., Khromov, S. I., Radzhabli-Seidova, N. A., Balenkova, Ye. S.

TITLE: The Formation of Aromatic Hydrocarbons at Contact-Catalytical Transformation of Heme-Dialkyl Cyclohexanes Over an Aluminum Silicate Catalyst

PERIODICAL: Azerb. khim. zh., 1959, No. 5, pp. 3-12 (Azerbaydzhan summary)

TEXT: The transformations were studied of 1-methyl-1-alkyl-cyclohexanes: 1,1-dimethyl-cyclohexane, 1-methyl-1-ethyl-cyclohexane, 1-methyl-1-propyl-cyclohexane, and 1-methyl-1-butyl-cyclohexane in a stream system over a synthetic aluminum-silicate catalyst at 500°C and 0.23 $hr^{-1}$ volume velocity. Hereat the following reactions proceed: detachment and rupture of the side chains, methylation in the nucleus, isomerization of the six-membered cycle to the five-membered one, and hydrogen disproportionation. Aromatic hydrocarbons are the main transformation products (output about 33-45 percentage by weight with respect to the

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S/081/60/000/022/002/016
A005/A001

The Formation of Aromatic Hydrocarbons at Contact-Catalytical Transformation of Heme-Dialkyl Cyclohexanes Over an Aluminum Silicate Catalyst

transformed 1-methyl-1-alkyl-cyclohexane): mixtures of the isomeric xylols and trimethylbenzenes, toluene, and a small quantity of benzene; in the xylol mixture the isomers content decreases in the sequence meta > para > ortho-isomers, whereat the content of the meta-isomer is approximately twice as high as that of the para-isomer for all 1-methyl-1-alkyl-cyclohexanes. The absence among the transformation products of 1-methyl-1-propyl-cyclohexane, 1-methyl-1-butyl cyclohexane, propyl- and respectively butyl-benzene points out that the alkyl group with larger chain length detaches easier. Moreover, alkanes are formed (in the main gaseous alkanes, predominantly $C_3H_8$ and $C_4H_{10}$), six-membered naphthenes (cyclohexane, methyl-cyclohexane) and five-membered naphthenes [cyclopentane, methyl-cyclopentane, 1,2-dimethyl-cyclopentane]. With increasing side-chain length of 1-methyl-1-alkyl-cyclohexane, the degree of transformation increases from 42% for 1,1-dimethyl-cyclohexane up to 84% for 1-methyl-1-butyl-cyclohexane. The transformation of 1-methyl-1-phenyl-cyclohexane over the same catalyst proceeds easier than that of 1-methyl-1-alkyl-cyclohexane, and 85% of 1-methyl-1-phenyl-cyclohexane undergoes already at 350°C the transformation without formation of gaseous products. Among

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GONIKBERG, Mark Gertsovich; KAZANSKIY, B.A., akademik, otv.red.; RUBINSHTEYN, A.M., prof., otv.red.; BANKVITSER, A.L., red. izd-va; MAKUNI, Ye.V., tekhn.red.

[Chemical equilibrium and rates of reactions at high pressures] Khimicheskoe ravnovesie i skorost' reaktsii pri vysokikh davleniiakh. Izd.2., perer. i dop. Moskva, Izd-vo Akad.nauk SSSR, 1960. 271 p. (MIRA 13:7)

(Chemical equilibrium) (Chemical reaction, Rate of)
(High pressure research)

MENDELEYEV, Dmitriy Ivanovich [deceased]; KEDROV, B.M., red.; PETROVSKIY, I.G., akademik, red.; ANDREYEV, N.N., akademik, red.; BYKOV, K.M., akademik, red. [deceased]; KAZANSKIY, B.A., akademik, red.; SHMIDT, O.Yu., akademik, red. [deceased]; SHCHERBAKOV, D.I., red.; YUDIN, P.F., akademik, red.; DELONE, B.N., red.; KOSHTOYANTS, Kh.S., red.; SAMARIN, A.M., red.; LEBEDEV, D.M., prof., red.; FIGUROVSKIY, N.A., prof., red.; KUZNETSOV, I.V., kand.filosof.nauk, red.; TRIFONOV, D.N., red.izd-va; NOVICHKOVA, N.D., tekhn.red.

[Periodic law; supplementary materials] Periodicheskii zakon; dopolnitel'nye materialy. Red.i kommentarii B.M.Kedrova. Moskva, Izd-vo Akad.nauk SSSR, 1960. 711 p. (MIRA 14:2)

1. Chleny-korrespondenty AN SSSR (for Delone, Koshtoyants, Samarin). (Periodic law)

PASTER, Lui [Pasteur, Louis]; IMSHENETSKIY, A.A., red.; PETROVSKIY, I.G., akademik, red.; ANDREYEV, N.N., akademik, red.; BYKOV, K.M., akademik, red. [deceased]; KAZANSKIY, B.A., akademik, red.; OPARIN, A.I., akademik, red.; SHMIDT, O.Yu., akademik, red. [deceased]; SHCHERBAKOV, D.I., akademik, red.; YUDIN, P.F., akademik, red.; KOSHTOYANTS, Kh.S., red.; SAMARIN, A.M., red.; MAKSIMOV, A.A., red.; LEBEDEV, D.M., doktor geograf.nauk, red.; FIGUROVSKIY, N.A., doktor khim.nauk, red.; KUZNETSOV, I.V., kand. filosof.nauk, red.; OZNOBISHIN, D.V., kand.istor.nauk, red.; MATVEYENKO, T.A., red.izd-va; DOROKHINA, I.N., tekhn.red.

[Selected works in two volumes] Izbrannye trudy v dvukh tomakh. Red.A.A.Imshenetskogo. Moskva, Izd-vo Akad.nauk SSSR. Vol.1, 1960. 1012 p. (MIRA 13:11)

1. Chleny-korrespondenty AN SSSR (for Imshenetskiy, Koshtoyants, Samarin, Maksimov).
(MICROBIOLOGY)

S/595/60/000/000/006/014
E196/E435

AUTHORS: Kazanskiy, B.A., Sterligov, O.D., Belen'kaya, A.P., Kondrat'yeva, G.Ya.

TITLE: Catalytic dehydrogenation of isopentane

SOURCE: Vsesoyuznoye soveshchaniye po khimicheskoy pererabotke neftyanykh uglevodorodov v poluprodukty dlya sinteza volokon i plasticheskikh mass. Baku, 1957. Baku, Izd-vo AN Azerb.SSR, 1960, 207-218

TEXT: Due to the lack of published information, the authors investigated the process of dehydrogenation of isopentane, which yields as the intermediate product isoamylenes, and, as the final product, isoprene, the monomer of synthetic rubber. The chrome-alumina catalyst K-544 was used. This catalyst, developed by M. N. Marushkin of IOKh AN SSSR, proved suitable for dehydrogenation of n-butane and propane; it is highly active chemically and has a high mechanical strength. All experiments were conducted in the following manner: fresh or reactivated catalyst in portions of 20 $cm^3$ was heated in a quartz tube to the reaction temperature in a current of air. The air was then purged by nitrogen and isopentane was introduced in the tube. The liquid

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reaction products were condensed by cooling with solid carbon dioxide, noncondensibles were collected in a gasholder. The unsaturated hydrocarbons in the condensate were estimated bromometrically by the Rosenmund and Halpern methods, isoprene was separately determined by weighing its adduct with maleic anhydride or colorimetrically by the method of R. F. Robey and H.V.Wiese. The catalyst was regenerated after each run by passing a current of air for one hour at the reaction temperature. Experiments have shown that during hourly working cycles in the temperature range 500 to 575°C and that of space velocities 0.3 to 4.2 $hr^{-1}$, the activity of the catalyst increased with temperature, reaching a maximum at 550°C, maintained independently of the space velocity in the range 0.7 to 2.6 $hr^{-1}$. Under those conditions the catalysate from isopentane contained up to 58% of unsaturated hydrocarbons, the yield of the latter being 45 to 49% on total isopentane and 70 to 90% on the decomposed isopentane. The productivity of the catalyst sharply increased with temperature, reaching the optimum value, about 700 g $C_5H_{10}$ $\ell/\ell$khr at 550°C and space velocity 2.6 $hr^{-1}$. Thus 550°C was the best operating point of this catalyst.

The noncondensible gas was found to consist largely of hydrogen with some methane. The liquid products were analysed for the individual unsaturated components by means of gas chromatography and light scattering; the results are given in Table 1. Analytical difficulties in the estimation of the unsaturated components by means of the Raman scattering spectra are discussed. They arise from the fact that the 1640 $cm^{-1}$ line of isoprene is 12 times more intensive than the 1642 $cm^{-1}$ line of 3-methylbutene-1. The masking effect of isoprene is therefore very strong and it tends to affect even the 1651 $cm^{-1}$ line of 2-methylbutene-1. In the chemical determination of total unsaturation of the catalysate, the Rosenmund method was found to give high values while the Halpern method gave low values. The correction factors which had to be applied were 0.96 and 1.04 respectively. Academicians N.D.Zelinskiy, A.A.Balandin, B.A.Kazanskiy, Corresponding Member AS USSR N.I.Shuykin, Yu.G.Mamedaliyev as well as V.T.Aleksanyan, Kh.Sterin of Komissiya po spektroskopii AN SSSR (Commission on Spectroscopy AS USSR) and Candidate of Chemical Sciences, Head of Gazovaya laboratoriya (Gas Laboratory) of VNIGNI MNP SSSR are mentioned in the paper. There are 9 figures, 6 tables and

Catalytic dehydrogenation ... S/595/60/000/000/006/014
E196/E435

4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to an English language publication reads as follows:
Ref.4: Robey R.F., Wiese H.V. Analyt. Chem., 20, 1948, 931.

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Catalytic dehydrogenation ... S/595/60/000/000/006/014
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Unsaturated components in catalysate % W/W

Table 1.

| Fraction 20 - 38° | 500° | 525° | 550° |
|---|---|---|---|
| Total unsaturation | 18.6 | 41.6 | 52.2 |
| Isoprene | 0.4 | 1.5 | 4.2 |
| 2-methylbutene-2 | 10 | 15 | 20/25* |
| 2-methylbutene-1 | 5 | 15 | 15/30* |
| 3-methylbutene-1 | 3 | 3 | 5/35* |

*The analysis was carried out before separation of dienes in the fraction 20-38°.

Card 5/5

5 3300, 5.119

AUTHORS: Eydus, Ye. T., Pozit'kiy, K. T., Perekhov, N. T., Kazanskiy, B. A.

TITLE: Catalytic Polymerization of Olefines. Communication III. Concerning the Activity of Nickel Monoxide-Silica Gel Catalyst in Ethylene Polymerization

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1960, Nr 1, pp 111-114 (USSR)

ABSTRACT: From 15 silica gel brands (ASM, ASK, KSK, ShSK, ShSM, MSM, KSM) only the brand KSK was found suitable for the preparation of active NiO-containing catalysts. KSK store showed no catalytic properties with respect to ethylene polymerization. The activity of NiO-KSK catalysts prepared from various KSK samples was not uniform and showed wide variations. This could be explained by the presence of $Al_2O_3$ impurities which imparted catalytic properties to silica gel. This will be discussed in future studies. There are 4

Card 1/2

Catalytic Properties of Carbon. Communication III

SOV/[illegible]

tables and 9 references, 3 U.S., 3 Japanese, 3 Soviet. The U.S. references are: H. D. Baxter, Industr. & Engrg. Chem., 29, 1244 (1937); F. H. Gayer, ibid., 25, 1122 (1933); S. J. Petzel, F. M. Kennedy, Chem. Abstr., 43, 1218, 6843 (1949).

ASSOCIATION: N. D. Zelinskiy Institute of Organic Chemistry, Academy of Sciences USSR (Institut organicheskoy khimii imeni N. D. Zelinskogo Akademii nauk SSSR)

SUBMITTED: May 4, 1958

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5.1190, 5.3300

78075
SOV/62-60-1-21/37

AUTHORS: Ya. T. Eydus, Puzitskiy, K. V., Kazanskiy, B. A.

TITLE: Catalytic Polymerization of Olefines. Communication IV. Concerning the Polymerization of Ethylene Over Nickelous Oxide-Silica Gel Catalyst Promoted by Aluminum Oxide

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, Nr 1, pp 115-119 (USSR)

ABSTRACT: Continuing a previous study of silica gel-NiO catalysts (this journal, 1960, p 111, our abstract 78074), the authors investigated the polymerization of ethylene at 300° C under atmospheric pressure, using KSK silica gel-NiO catalysts with the addition of $Al(NO_3)_3 \cdot 9H_2O$ in concentrations varying from 0.025 to 10.0%. The addition of the latter increased considerably the activity of the catalyst. The activity changed little in the aluminum nitrate concentration range 0.5-10% but decreased rapidly at concentrations below 0.5%. Only KSK silica gel,

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Catalytic Polymerization of Olefines. Communication IV

78075
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as carrier of aluminum oxide, and nickelous oxide gave positive catalytic results. Catalysts prepared from NiO on other carriers, such as aluminum oxide, kieselguhr, various clays, or activated carbons were inactive. Catalyst $NiO-Al_2O_3$-KSK prepared from nickelous nitrate by precipitation with potassium carbonate were inactive. Catalyst obtained by precipitation with aqueous ammonia solution was active but insufficiently stable. Its regenerative capacity, as well as selectivity with respect to dimerization of ethylene was somewhat increased by addition of zinc oxide. There are 3 tables; 1 figure; and 6 references, 3 U.S., 1 U.K., 2 Soviet. The 4 U.S. and U.K. references are: S. J. Hetzel, R. M. Kennedy, U.S. Pat. 2452190 (1948); Phillips Petr. Co., Brit. Pat. 619231 (1949); J. P. Hogan, R. L. Banks, W. C. Lanning, A. Clark, Industr. & Engng. Chem., 47, 752 (1955); H. A. Cheney, S. H. McAllister, E. B. Fountain, J. Anderson, W. H. Peterson, ibid., 42, 2580 (1950).

Card 2/3

Catalytic Polymerization of Olefines
Communication IV

78075
SOV/62-60-1-21/37

ASSOCIATION: N. D. Zelinskiy Institute of Organic Chemistry, Academy of Sciences USSR (Institut organicheskoy khimii imeni N. D. Zelinskogo Akademii nauk SSSR).

SUBMITTED: May 21, 1958

Card 3/3

5.3300

78080
SOV/62-60-1-26/37

AUTHORS: Gostunskaya, I. V., Tyun'kina, N. I., Kazanskiy, B. A.

TITLE: Brief Communications. Isomerization of Some Dienes in the Presence of Calcium Amide

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, Nr 1, pp 132-133 (USSR)

ABSTRACT: Isomerization of 1,5-hexadiene, 2-methyl-1,5-hexadiene, and 2,5-dimethyl-1,5-hexadiene in the presence of calcium amide at 70° in a flow system with a space velocity 0.2, was studied in order to find correlations between the structure of the investigated dienes and the rate of their isomerization. The data obtained were compared with those obtained by A. Henne and A. Turk (J. Am. Chem. Soc., 64, 826, 1942) using $Al_2O_3$ as a catalyst, under identical conditions, at 365°. The data obtained show that there is not much difference in the rate of isomerization of different dienes with calcium amide, but there is a big difference in the

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Brief Communications. Isomerization of Some Dienes in the Presence of Calcium Amide

78080
SOV/62-60-1-26/37

Key: (a) Starting diene; (b) properties of diene; (c) bp in °C; (d) properties of products of catalysis; (e) degree of isomerization.

| a | b | | | d | | e | |
|---|---|---|---|---|---|---|---|
| | c | $n_D^{20}$ | $d_4^{20}$ | $n_D^{20}$ | $d_4^{20}$ | $Ca(NH_2)_2$ | $Ab'_2$ |
| $CH_2=CH-CH_2-CH_2-CH=CH_2$ | 59,7 | 1,4038 | 0,6935 | 1,4388 | 0,7164 | 72 | 39 |
| $CH_2=C(CH_3)-CH_2-CH_2-CH=CH_2$ | 88,1 | 1,4192 | 0,7190 | 1,4570 | 0,7314 | 77 | 58 |
| $CH_2=C(CH_3)-CH_2-CH_2-C(CH_3)=CH_2$ | 113,9 | 1,4299 | 0,7419 | 1,4714 | 0,7595 | 83 | 81 |

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rate of isomerization of dienes with $Al_2O_3$. The above data confirm the generally accepted view that acid and basic catalysts have different mechanisms. Isomerization of olefins in the presence of an acid catalyst ($Al_2O_3$) proceeds through the formation of intermediate carbonium ions:

$$R-CH_2-CH=CH_2 + HA \underset{\text{catalyst}}{\rightarrow} R-CH_2-\overset{+}{C}H-CH_3A^-.$$

Isomerization of olefins in the presence of a basic catalyst ($Ca(NH_2)_2$) proceeds, apparently, through the formation of carbanions by elimination of protons.

Brief Communications. Isomerization of Some Dienes in the Presence of Calcium Amide

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$$R-CH_2-CH=CH_2+MeNH_2 \rightarrow [R-\bar{C}H-CH=CH_2]\,Me\overset{+}{N}H_3 \rightarrow$$

$$\rightarrow [R-CH=CH-\dot{C}H_2]\,Me\overset{+}{N}H_3 \rightarrow R-CH=CH-CH_3+MeNH_2.$$

There are 1 table; and 4 references, 1 U.S., 3 Soviet. The U.S. reference is: A. Henne, A. Turk, J. Am. Chem. Soc., 64, 826 (1942).

ASSOCIATION: M. V. Lomonosov Moscow State University (Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova)

SUBMITTED: June 9, 1959

Card 4/4

S/062/60/000/03/06/007
B008/B006

AUTHORS: Eydus, Ya. T., Puzitskiy, K. V., Kazanskiy, B. A.

TITLE: Catalytic Polymerization of Olefines. 6. Effect of Some Metal Oxides on the Activity of $NiO-Al_2O_3$-Silica Gel (KSK) Catalyst in Polymerization of Ethylene

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, No. 3, pp. 513-518

TEXT: The effect of admixtures of copper, silver, zinc, magnesium, calcium, barium, thorium, and manganese oxides on the activity of a $NiO-Al_2O_3$-silica gel catalyst type KCK (KSK) was investigated. These admixtures were introduced by treating the boiling silica gel with aqueous solutions of the corresponding nitrate. For the rest, the methods and apparatus described in Refs. 1 and 2 were used. The results obtained are listed in Tables 1 and 2. For comparison, experimental data from experiments carried out using corresponding catalysts containing no metal oxide admixtures except $Al_2O_3$ are shown in Table 3. It was found

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Catalytic Polymerization of Olefines. 6. Effect of Some Metal Oxides on the Activity of $NiO-Al_2O_3$-Silica Gel (KSK) Catalyst in Polymerization of Ethylene

S/062/60/000/03/06/007
B008/B006

that the activity of the catalyst is strongly reduced by admixtures of silver-, calcium-, and barium oxides, and slightly by thorium dioxide. Admixtures of copper-, zinc-, manganese-, and magnesium oxides have hardly any effect. The selectivity of the catalyst with respect to ethylene dimerization is considerably increased by adding copper-, silver-, zinc-, barium-, and manganese oxides, and, to a lesser extent, by the addition of calcium- and magnesium oxides. The catalytic stability of the contact is strongly reduced by silver- and calcium oxide admixtures. Manganese oxide has the reverse effect. Regeneration of the catalyst is inhibited by the addition of copper- and zinc oxides, and is impossible if the catalyst contains silver-, magnesium-, calcium- and barium oxides. Catalysts mixed with silver-, magnesium-, and calcium oxides lose their selectivity when treated with air at 450°C. In catalysts containing magnesium oxide however, selectivity is preserved. Yu. A. Bitepazh is mentioned. There are 3 tables and 20 references, 16 of which are Soviet.

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Catalytic Polymerization of Olefines. 6. Effect of Some Metal Oxides on the Activity of $NiO-Al_2O_3$-Silica Gel (KSK) Catalyst in Polymerization of Ethylene

S/062/60/000/03/06/007
B008/B006

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: July 21, 1958

Card 3/3

KYDUS, Ya.T.; PUZITSKIY, K.V.; YERSHOV, N.I.; KAZANSKIY, B.A.

Catalytic polymerization of olefins. Report No.8: Polymerization of ethylene over a nickel - aluminosilicate catalyst. Izv.AN SSSR Otd.khim.nauk no.5:920-925 My '60. (MIRA 13:6)

1. Institut organicheskoy khimii imeni N.D. Zelinskogo Akademii nauk SSSR.
(Ethylene) (Polymerization) (Catalysts)

EYDUS, Ya.T.; PUZITSKIY, K.V.; YERSHOV, N.I.; KAZANSKIY, B.A.

Catalytic polymerization of olefins. Report No.10: Effect of the temperature and contact time on the course of ethylene polymerization on nickel catalysts. Izv.AN SSSR.Otd.khim. nauk no.6:1114-1118 Jl '60. (MIRA 13:7)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo Akademii nauk SSSR.
(Ethylene) (Polymerization) (Catalysts, Nickel)

KAZANSKIY, B.A.; LUKINA, N.Yu.; NAKHAPETYAN, L.A.; ZOTOVA, S.V.; LOZA, G.V.; SHATENSHTEYN, G.A.; OVODOVA, V.A.; UVAROV, O.V.; SOKOLOV, N.M.; SMOL'NIKOV, V.P.

Production of high purity cyclopropane. Khim. prom. no. 6:462-465 S '60. (MIRA 13:11)

(Cyclopropane)

KAZANSKIY, B.A.

S/062/60/000/007/015/017/XX
B004/B064

AUTHORS: Rydus, Ya. T., Pustitskiy, K. V., Yershov, N. I., Guseva, I. V., and Kazanskiy, B. A.

TITLE: Catalytic Polymerization of Olefins. Communication 11. The Effect of Impurities in the Initial Gas and of the Material of the Test Tube Wall Upon the Course of the Polymerization Reaction of Ethylene on Nickel Catalysts

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, No. 7, pp. 1291 - 1294

TEXT: The authors are concerned with studying the effects of all reaction conditions upon the catalytic polymerization of olefins. In the present paper, they report on the effect of impurities in initial ethylene, the influence exerted upon the catalyst by treating it with various substances, and finally the effect exerted upon catalysis by the material of the tube walls. Up to 5% propylene or up to 10% butylene were added to ethylene as impurities. Ethylene was polymerized

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to butylene on a $NiO-Al_2O_3$ catalyst. While an addition of 0.5 to 1% impurities showed no effect, the activity of the catalyst decreased at higher amounts of admixtures (yield without addition: 82%, with an addition of 5%: 56.2%). An addition of 30 - 40% $H_2$ or preliminary treatment of the catalyst with $H_2$ (yield without $H_2$: 58.8%, with $H_2$: 23.0%) showed the same effect. The water vapor content of ethylene also reduced the activity of the catalyst. On comparing the activity of the catalyst in test tubes of glass, brass, or stainless steel it was found that in the steel tube the yield in polymers and the regeneration capacity of the catalyst decrease: maximum yield in the glass- and brass tubes 71.2%, in the steel tube 64.7%. There are 1 figure, 5 tables, and 2 Soviet references.

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ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: November 12, 1958

Card 3/3

KAZANSKIY, B.A.; DOROGOCHINSKIY, A.Z.; ROZENGART, M.I.; LYUTER, A.V.; MITROFANOV, M.G.

Aromatization of narrow hexane fractions of Groznyi gasoline on an alumina-chromic oxide catalyst. Kin.i kat. 1 no.2:294-299 Jl-Ag '60. (MIRA 13:8)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR i Groznenskiy nauchno-issledovatel'skiy neftyanoy institut.
(Aromatization)
(Hexane)

S/195/60/001/004/013/015
B017/B055

AUTHORS: Gostunskaya, I. V., Dobroserdova, N. F., Berdnikova, M. P., Kazanskiy, B. A.

TITLE: Isomerization of Several Hexenes Over Calcium Amide

PERIODICAL: Kinetika i kataliz, 1960, Vol. 1, No. 4, pp. 612-616

TEXT: The authors investigated the isomerization of 1-hexene, 2-methyl 1-pentene, 3-methyl 1-pentene, 4-methyl 1-pentene, and 2,3-dimethyl 1-butene on calcium amide as catalyst. The data obtained are listed in Table 1. This table also gives a comparison with aluminum oxide as catalyst. The composition of the fractions obtained is shown in Tables 3-7. The boiling-point curves of the isomerizates of the hexenes are graphically represented in Figs. 1 and 2. A comparison of the relative isomerization rates of hexenes on $Al_2O_3$ and calcium amide as catalysts shows that the structure of the olefin has less influence on the rate of isomerization in the case of calcium amide. There are 2 figures, 7 tables, and 10 references: 6 Soviet and 4 US.

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Isomerization of Several Hexenes Over Calcium Amide

S/195/60/001/004/013/015
B017/B055

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: July 23, 1960

Card 2/2

LIBERMAN, A.L.; VASINA, T.V.; KAZANSKIY, B.A.

Stereospecificity of the interaction between esters of stereoisomeric 1,4-cyclohexanedicarboxylic acids and a Grignard reagent. Zhur. ob. khim. 30 no.12:3938-3945 D '60. (MIRA 13:12)

1. Institut organicheskoy khimii Akademii nauk SSSR.
(Cyclohexanedicarboxylic acid)
(Grignard reagents)

MIKHAYLOVA, Ye.A.; SMIRNOVA, E.N.; PETUKHOVA, V.A.; KAZANSKIY, B.A. (Moscow)

Effect of the chemical structure of alkyl benzenes on their adsorbability on silica gel. Zhur. fiz. khim. 34 no.4:824-832 Ap '60. (MIRA 14:5)

(Benzene) (Adsorption) (Silica)

5(3)

SOV/20-130-1-22/69

AUTHORS: Kazanskiy, B. A., Academician, Gostunskaya, I. V., Dobroserdova, N.B.

TITLE: Isomerization of Some Hexenes in the Presence of Aluminum Oxide

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 1, pp 82-85 (USSR)

ABSTRACT: The authors investigated the influence of the structure of monoolefins on the relative displacement velocity of the double bond in the presence of an acid catalyst (aluminum oxide). As is known, the same olefins may behave differently in the presence of catalysts of different kinds (acid or alkaline). Also the structure of the monoolefin may affect the readiness of isomerization. The authors carried out the isomerization at 80° and a volume velocity of 2.64 $h^{-1}$, and 0.23 $h^{-1}$ (for difficultly isomerizable hexenes), respectively. The relative isomerization rates were characterized by the amount of olefin transformed under equal conditions. Table 1 shows the results. The different behavior of the individual hexenes is clearly to be seen: 2-methyl-pentene-1 and 2,3-dimethyl-butene-1 isomerize quickly, whereas hexene-1, 3-methyl-pentene-1 and 4-methyl-pentene-1 and 4-methyl-pentene-1 isomerize very slowly. The readiness of isomerization of the two former substances is explained by the

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presence of methyl groups on the double bond. They have an electron-donor character, and facilitate the addition of the proton to the olefin while a carbonium ion is formed. The other 3 hexenes have no alkyl substituents on the double bond. They form the carbonium ion with greater difficulty, and therefore isomerize more slowly. The authors' results permit a correct choice of catalysts for the isomerization and of the conditions for experiments with an olefin of a given structure. On the other hand, an undesirable isomerizing effect of substances with acid properties during other reactions (hydrogenation, alkylation, etc) can be avoided on the basis of these data. Table 2 presents the constants of hexenes with a double bond within the chain, which may have developed by a shift of the double bond of the initial olefins. Figure 1 shows the fractionation curve of the

Isomerization of Some Hexenes in the Presence of Aluminum Oxide

SOV/20-130-1-22/69

2-methyl-pentene-1 and of the 2,3-dimethyl-butene-1, and table 3 shows the characteristics of the fractions obtained. Figures 2 and 3 present the said curves for the other substances investigated. There are 3 figures, 3 tables, and 6 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: September 28, 1959

Card 3/3

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SOV/20-130-2-21/69

AUTHORS: Kazanskiy, B. A., Academician, Lukina, M. Yu., Safonova, I. L.

TITLE: Synthesis and Catalytic Hydrogenation of Diphenylcyclopropanes

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 2, pp 322 - 325 (USSR)

ABSTRACT: From the standpoint of modern theory, the structure of the cyclopropane ring has not been fully clarified as yet. According to several papers (Refs 1-3), the carbon atoms in cyclopropane have the same electron configuration as the C-atoms in ethylene. Various explanations of the interaction of the 6 orbits (3 $sp^2$ and 3 p) assume that one valence of each carbon represents an almost pure p-orbit. Thus, this valence is similar to the orbits forming the $\pi$- bond. From this point of view, the presence of a $\pi$-electron cloud in the cyclopropane ring may be assumed. According to the theory, it lies on the perimeter in the plane of the triangle (Fig 1). This cloud must make possible the conjugation of the 3-membered ring with unsaturated

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groups such as the carbon-carbon double bond, the carbonyl group or the phenyl ring. As the conjugation can only occur if the axes of the ring and of the substituent are parallel or nearly parallel, it is evident that the steric position of several substituents decides on the higher or lower occurrence of the conjugation. It was proved recently (Refs 7,8) that the conjugation effect is differently high with two stereoisomers. The investigation of the steric models of the stereoisomers of these hydrocarbons showed that in the cis-isomers one or both of these groups are partly displaced from a position favorable to conjugation due to the close position of two substituting groups. For this reason, a cis-configuration may be ascribed to the stereoisomers with lower conjugation. Thus, it may be assumed that no conjugation must occur in 1,1-diphenylcyclopropane since both phenyl groups can only have a steric position which excludes the parallel position of the axes of their $\pi$-clouds with respect to the plane of the 3-membered ring. This assumption was confirmed experimentally by Raman spectra. In the present paper, the authors studied the reactivity of cis- and trans-

Synthesis and Catalytic Hydrogenation of Diphenyl- SOV/20-130-2-21/69
cyclopropanes

1,2-diphenylcyclopropane and of 1,1-diphenylcyclopropane on the example of hydrogenation in the presence of palladium black (Refs 9-12). The data obtained are in full agreement with the results of the Raman spectra. Thus, the behavior of 1,1-diphenylcyclopropane in this reaction is quite similar to that of a nonconjugated hydrocarbon. It does not absorb any hydrogen. In cis- and trans-1,2-diphenylcyclopropane, hydrogen is absorbed by two low-hydrogenized carbons of the ring. 1,3-diphenylpropane develops here (see Scheme). Steric factors also influence the rate of hydrogenation. Thus, it was proved that the reactivity of diphenylcyclopropanes depends on the steric position of the substituents. The Raman spectrum of 1,1-diphenylcyclopropane will be published shortly. There are 1 figure, 3 tables, and 16 references, 10 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: September 30, 1959

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5(3)

S/020/60/130/03/019/065
B011/B016

AUTHORS: Kazanskiy, B. A., Academician, Nakhapetyan, L. A., Aleksanyan, V. T., Sterin, Kh. Ye., Podkhalyuzin, A. T.

TITLE: Dehydration of Dimethyl-cyclopentyl-carbinol in the Presence of Sulfuric Acid

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 3, pp 552-555 (USSR)

ABSTRACT: The authors carried out the reaction mentioned in the title with 0.1% concentrated $H_2SO_4$, in order to clarify in what way a five-membered ring acts on the course of the reaction. The reaction conditions were the same as in one of their previous papers (Ref 1). The authors also this time obtained a mixture of unsaturated hydrocarbons, from which the following individual hydrocarbons were separated by distillation: isopropyl-cyclopentene-1, isopropenyl-cyclopentane (produced for the first time), and isopropylidene-cyclopentane. Herefrom the authors conclude that the reaction had proceeded according to the scheme (cf Fig). The structure of the separated compounds was

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confirmed by the agreement of the constants of two of them with data available in publications. The Raman spectra offered further proof of their structure. While the present investigation was being carried out, a paper by G. Chiurdoglu and S. Van Walle (Ref 4) was published, who investigated the dehydration of cyclic carbinols by distillation with 0.01% $H_2SO_4$. The authors carried out the reaction mentioned in the title also under these conditions. By means of the Raman spectra of the dehydration products they found that with 0.01% $H_2SO_4$ also a mixture of isopropyl-cyclopentene-1, isopropenyl-, and isopropylidene-cyclopentane results. The quantitative ratio of these components, however, varies according to the quantity of $H_2SO_4$. With increasing quantity the content of isopropenyl-cyclopentane decreases from 68-63% to 40-35%. At the same time, the quantity of the other two hydrocarbons increases. Also the yield of dehydration products increases from 66% to 91%. Thus, the results obtained by the authors are not in agreement with those of reference 4. The authors point out that the constants

Dehydration of Dimethyl-cyclopentyl-carbinol in the Presence of Sulfuric Acid

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B011/B016

of isopropenyl-cyclobutane and isopropenyl-cyclopentane of reference 4 deviate considerably from those obtained by themselves. They assume that in reference 4 no individual hydrocarbons, but mixtures of unsaturated hydrocarbons with a different position of the double bond were under consideration. There are 1 figure, 1 table, and 5 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: November 13, 1959

Card 3/3

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S/020/60/132/01/34/064
B011/B126

AUTHORS: Liberman, A. L., Vasina, T. V., Kazanskiy, B. A., Academician

TITLE: The Steric Configuration of Stereoisomeric 1,4-Diisopropylcyclohexanes

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 1, pp. 130-133

TEXT: The authors encountered a peculiar deviation from the Auvers-Skit rule, in that the cis-forms of the di-substituted cyclanes have a higher boiling point than the trans-forms. Since several facts of this sort exist, the authors have decided to confirm the said rule in respect of synthetically produced 1,4-diisopropyl-cyclohexanes. By that means the spectroscopic proofs were to be completed. The initial substances used were dimethyl esters of cis- and trans-hexahydroterephthalic acids, whose steric configuration (as of the acids themselves) stands beyond question (Refs. 7, 8). Each of the stereoisomers was to be separately changed into the relevant form of 1,4-diisopropyl-cyclohexane (see scheme). This synthesis succeeded at first in the stereo-specific form only for the trans-forms. The syntheses and properties of the newly obtained stereoisomeric diols, the transdichloride and some other substances are not given in

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The Steric Configuration of Stereoisomeric 1,4-Diisopropylcyclohexanes

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B011/B126

detail here. A detailed publication follows. The original dimethyl-esters of cis- and trans-cyclohexane-1,4-dicarboxylic acids were separated by distillation, and showed the above-mentioned deviation from the Auvers-Skit rule. 1,4-Bis-($\alpha$-oxyisopropyl)-cyclohexanes were obtained by reaction of the esters of stereoisomeric acids with the great surplus of methyl-magnesium-chloride or methyl-magnesium-bromide. The appropriate dichlorides were produced by saturation of the diols with anhydrous HCl in a methanolic solution. The trans-isomer was obtained in pure state, while a mixture of inseparable cis- and trans-dichlorides came from the cis-diol. It was very difficult to substitute hydrogen for chlorine. The familiar methods have failed here. The authors have succeeded in finding a suitable solvent, namely ethylacetate. It contains not only dichloride and $CrCl_2$, but also $CrCl_3$ in fairly soluble form. $CrCl_2$ forms directly from the latter in the ethylacetate solution. The required reaction could thus be carried out at room temperature. Table 1 shows the constants of the trans-1,4-diisopropyl-cyclohexane that was produced. They show that the configurations of the stereoisomers that were determined earlier (Ref. 1), on the basis of the Raman spectra, were right. A certain deviation of the constant of the synthetic preparation from that of the high-purity product separated by distillation (Ref. 1), is explained through the presence of a small admixture of the cis-isomer in the

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The Steric Configuration of Stereoisomeric 1,4-Diisopropylcyclohexanes

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B011/B126

former (7-10%). Since it could not be decided on such a high content of the other form from the distinct melting temperatures of the diol and the dichloride, the authors say that the stereoisomeric mixture arose during the separation of the chlorine. Apparently HCl is partly split off with local overheating. HCl can then accumulate on the newlyformed double bond. Thus cis- and trans-forms occur (see scheme). This sub-reaction takes place only in small proportion. The splitting-off of chlorine leads mainly to the formation of the trans-isomer. The above-mentioned deviation from the Auvers-Skit rule is again confirmed by these facts. The following are mentioned: G. P. Men'shikov, V. T. Aleksanyan, Kh. Ye. Sterin (the last two: Komissiya po spektroskopii OFMN (Otdeleniye fiziko-matematicheskikh nauk) AN SSSR (Spectroscopic Commission of the Department of Physical and Mathematical Sciences, AS USSR)). There are 1 table and 10 references, 4 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: January 25, 1960

Card 3/3



S/020/60/132/04/27/064
B011/B003

5.3200

AUTHORS: Kazanskiy, B. A., Academician, Panchenkov, G. M., Lazarev, V. I.

TITLE: Hydrogenation of 2-Methyl-butene-1 in the Presence of Platinum Black in Deuterated Alcohol

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 4, pp. 832-835

TEXT: In the article under review, the authors intend to clarify the problem as to whether the hydrogen of alcohol hydroxyl directly participates in the reaction of catalytic hydrogenation. For this purpose they studied the hydrogenation mentioned in the title. The rectified ethanol which served as medium contained 3.3 per cent of deuterium in the hydroxyl. The hydrocarbon formed was analyzed on a mass spectrometer in order to determine the deuterium content. Results listed in Table 1 demonstrate that isopentane with a content of about 2.3 per cent of monodeuteroisopentane forms in hydrogenation. No dideuteroisopentanes

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Hydrogenation of 2-Methyl-butene-1 in the Presence of Platinum Black in Deuterated Alcohol

S/020/60/132/04/27/064
B011/B003

alcohol yields hydrogen with a content of 3.4 per cent of HD, whereas isopentane formed by hydrogenation contains only 2.3 per cent of monodeuteroisopentane. The authors explain this fact by the different rates of exchange reactions of $C_2H_5OD$ for $H_2$ as well as by olefin hydrogenation on the surface of the catalyst. Hence it results that the hydroxyl hydrogen of the alcohol solvent does not directly participate in the reaction of hydrogenation. The hydroxyl hydrogen is exchanged for the hydrogen sorbed on the surface of the catalyst. If, however, an olefin is present in the system, it reacts with the sorbed $H_2$ and HD in such a way that it is also sorbed on platinum. Thus, the two possible reactions of isotopic exchange between the olefin and hydrogen and the alcohol as well as the reaction of hydrogenation of the olefin have a limiting stage in common, i.e., the sorption of hydrogen on platinum. If all these processes take place simultaneously, the exchange reactions are retarded, whereas the exchange of the olefin for alcohol is completely surpressed. The authors thank L. N. Gorokhov, Z. V. Gryaznova, and I. V. Gostunskaya for their assistance. There are 2 tables and 17 references,

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KAZANSKIY, B.A., akademik; LIBERMAN, A.L.; KUZNETSOVA, I.M.; ALEKSANYAN, V.T.; STERIN, Kh.Ye.; LOZA, G.V.

$C_4$-Dehydrocyclisation of alkyl cyclopentanes into bicyclic hydrocarbons. Dokl.AN SSSR 133 no.2:364-366 Jl '60. (MIRA 13:7)

1. Institut organicheskoy khimii im. N.D.Zelinskogo Akademii nauk SSSR i Komissiya po spektroskopii Akademii nauk SSSR.
(Cyclopentane) (Cyclization)

84651

5.3300 only 2209, 1285

S/020/60/133/005/032/034/XX
B016/B060

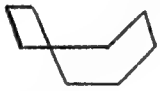
AUTHORS: Kazanskiy, B. A., Academician, Shokova, E. A., Khromov, S. I., Aleksanyan, V. T., and Sterin, Kh. Ye.

TITLE: Contact Conversions of Cyclooctane in the Presence of Platinized Coal

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 5, pp. 1090 - 1093

TEXT: The authors wanted to find out the behavior of polymethylenes of average ring size on platinized coal at lower temperatures than those applied by V. Prelog (Ref. 1). Moreover, they wanted to repeat the incomplete work of N. D. Zelinskiy and G. I. Freyman (Ref. 3). According to the latest notions, cyclooctane can principally exist in two most stable forms:

(I)



(II)

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The amount of (II) in cyclooctane is probably very small. In the centrosymmetric form (I), the four equatorial hydrogen atoms are placed higher than the central ring plane, whereas other four of them are placed below this plane. When any pair of these atoms in 1,5-position separates, the transannular C-C bond may form and cis-bicyclo-(0,3,3)-octane-(cis-pentalane) may result. In this work, the authors examined the conversions of cyclooctane on platinized coal at 310° in the presence and in the absence of hydrogen. A quantitative conversion of cyclooctane took place in both cases. In the absence of hydrogen, cis-bicyclo-(0,3,3)-octane-(cis-pentalane) developed in an amount of about 51 wt% of the catalyzate. Appreciable amounts were also obtained of trans-1-methyl-2-ethyl cyclopentane (about 23%) and n-propyl cyclopentane (about 20%), as well as smaller amounts (about 6%) of 4-methyl heptane. Basing on the reaction products, the authors set up a scheme of this reaction. Apparently, the first stage is the formation of cis-pentalane which then undergoes hydrogenolysis under the action of the resulting hydrogen. Trans-1-methyl-2-ethyl cyclopentane and n-propyl cyclopentane thus result. 4-methyl-1-heptane is formed by the hydrogenolysis of the latter. The same substances were formed in the presence of hydrogen, but the quantitative proportion was different. This

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is explained by a more intense hydrogenolysis of the five-membered ring in the presence of hydrogen. At the same time, the hydrogenolysis of pentalane and n-propyl cyclopentane takes place more smoothly than that of 1-methyl-2-ethyl cyclopentane. The authors were not able to detect methyl cycloheptane in the reaction products (as conversely stated in Ref. 3). About 1 - 2% of aromatic hydrocarbons were obtained: toluene, ethyl benzene, and o-xylene. Tables 1 - 4 collect the results of distillation, the individual fractions together with their constants, and the quantitative proportions of the resulting substances. They were determined from the Raman spectra (monograph by G. S. Landsberg, E. A. Kazanskiy, and others, Ref. 9) of the fractions. A paper by A. L. Liberman and others (Ref. 10) is mentioned. There are 4 tables and 11 references: 6 Soviet, 3 US, 1 Swiss, and 1 French.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov). Komissiya po spektroskopii Akademii nauk SSSR (Commission for Spectroscopy of the Academy of Sciences USSR)

SUBMITTED: May 11, 1960

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KAZANSKIY, B.A., akademik; LIBERMAN, A.L.; TYUN'KINA, N.I.

Deviation of stereoisomeric 1,4-bis-tert. butylcyclohexanes from the Auwers-Skita rule. Dokl. AN SSSR 134 no.1:93-95 S '60. (MIRA 13:8)

1. Institut organicheskoy khimii im. N.D. Zelinskogo Akademii nauk SSSR.

(Cyclohexane)

S/020/60/134/003/012/020
B016/B054

AUTHORS: Liberman, A. L., Tyun'kina, N. I., and Kazanskiy, B. A., Academician

TITLE: The Stereoisomeric 1,4-Di-n-Propyl- and 1-Methyl-$4^2$-metho-4-butyl Cyclohexanes

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 3, pp. 603-606

TEXT: After having proved (Refs. 1-3) that the physical properties of some 1,4-dialkyl cyclohexanes deviate from the constants usually holding for this series, the authors expressed the opinion that the differences between the boiling points of the stereoisomers ($\Delta t = t_{cis} - t_{trans}$) are linearly dependent on the molecular weight (Ref. 4). There were, however, several deviations from this rule. This is explained by the fact that the structure of the side chain was not considered. The present paper is to clarify the influence of this structure. For this purpose, the authors synthesized 1,4-di-n-propyl- and 1-methyl-$4^2$-metho-4-butyl cyclohexanes, and separated them into cis- and trans-isomers. These two compounds are

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structural isomers of 1,4-di-isopropyl cyclohexane, in whose stereoisomers there occurs an inversion of boiling points. The hydrocarbons were chosen in such a way that in one case their side chains were equal, while being different in another. This should make it clear in how far the asymmetry of radicals can influence the value $\Delta t$. It was found that the trans-form of the stereoisomers produced in this investigation boils lower than the cis-form, i.e., $\Delta t$ has a positive value, whereas the value of 1,4-di-isopropyl cyclohexanes was negative (Refs. 1,4). Thus, the primary, secondary, or tertiary character of the side chain considerably influences the relation of boiling points of the stereoisomeric dialkyl cyclohexanes. The problem of a linear dependence in the series of 1,4-dialkyl cyclohexanes with primary radicals remains unsolved. The authors synthesized the hydrocarbons in such a way that products of maximum possible purity were formed. The hydrogen addition to the double bond of the resulting intermediate product, butenyl toluene, is (in the presence of platinum at room temperature) accompanied by partial hydrogenation of the benzene ring. Nevertheless, it was possible to obtain the hitherto unknown $4^2$-metho-4-butyl toluene by distillation in the pure state. Further, $4^2$-oxy-$4^2$-metho-4-butyl toluene was produced for the first time. The

The Stereoisomeric 1,4-Di-n-Propyl- and 1-Methyl-4$^2$-metho-4-butyl Cyclohexanes

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B016/B054

configuration, hitherto not described in publications, of the four stereoisomers was determined with the aid of the Raman spectra (taken by V. T. Aleksanyan and Kh. Ye. Sterin, co-workers of the Komissiya po spektroskopii (Commission on Spectroscopy) OFMN AN SSSR (Department of Physical and Mathematical Sciences of the Academy of Sciences, USSR)). Table 1 shows that both the refractive indices and the specific gravities are in all cases higher in the cis-forms, whereas the boiling points of the cis-forms are higher or lower depending on the structure of the side chains. Fig. 1 shows refractive index and specific gravity of the fractions of the hydrocarbons investigated. There are 1 figure, 1 table, and 10 references: 8 Soviet and 2 US.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: June 6, 1960

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S/020/60/134/006/017/031
B016/B067

AUTHORS: Kazanskiy, B. A., Academician, Rozengart, M. I., and Freyberg, L. A.

TITLE: Effect of Potash and Phosphoric Acid Additions on the Aromatizing Activity of Chromium Oxide

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 6, pp. 1360-1362

TEXT: The aromatizing activity of the Al-Cr catalyst in the reactions of dehydrocyclization of n-heptane and the dehydrogenation of cyclohexane is favored by the alkali and alkaline-earth elements (Ref. 1). The authors wanted to study the effect of additions on the catalytic activity of pure chromium oxide in the conversion reactions of hydrocarbons, since in the Al-Cr catalyst chromium is the effective agent. The experiments which were conducted at 450°C and a volume rate of 0.8 $h^{-1}$ proved that an addition of 0.25 wt% of $K_2O$ in the form of potash completely inhibits the reactions of dehydrocyclization of n-heptane.

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Effect of Potash and Phosphoric Acid Additions on the Aromatizing Activity of Chromium Oxide

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Furthermore, the formation of unsaturated compounds is reduced to 1/7, and the cracking and isomerizing secondary effect of the catalyst is almost completely eliminated. This addition produced the same effect on the dehydrogenation of cyclohexane to benzene. However, toluene was formed from an n-heptane + n-heptene-1-mixture if potash was added to the catalyst. The yield of toluene in this case was by 60% lower than that without addition of potash. The authors wanted to clarify whether the inhibiting effect of potash is a specific result of its alkaline nature. For this purpose they studied the effect of additions of 0.14 wt% of phosphoric acid on chromium oxide. The effect was the same as that of potash. Additions of both types also reduced the hydrogenating effect of the catalyst. These experiments show that the promoting effect of potassium on the Al-Cr catalyst is not due to the interaction of the alkaline addition with chromium oxide. This effect has a more complicated nature and apparently is the consequence of the interaction of all three components: of chromium oxide, of aluminum oxide, and of the alkaline addition. One of the forms of this interaction was described earlier (Ref. 2). The fact that the aromatization of heptane and cyclohexane

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Effect of Potash and Phosphoric Acid Additions on the Aromatizing Activity of Chromium Oxide

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ceases after the introduction of $K_2CO_3$ or $H_3PO_4$ on pure chromium oxide, whereas the aromatization of heptane continues, can be explained by the fact that the two additions influence the first stage of catalysis, i.e., activated adsorption. The authors assume that these additions prevent the adsorption of the saturated hydrocarbons at the active centers of the Cr catalyst. The adsorption of the much more active olefin molecules is inhibited much less. To explain the details of this phenomenon, further studies are necessary. The authors mention papers by A. M. Rubinshteyn, N. A. Pribytkova, and A. A. Slinkin (Ref. 2). Table 1 gives the results of the above aromatization experiments. There are 1 table and 2 Soviet references.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: July 15, 1960

Card 3/3

S/020/60/135/002/020/036
B016/B052

AUTHORS: Kazanskiy, B. A., Academician, Khromov, S. I., Liberman, A. L., Balenkova, Ye. S., Vasina, T. V., Aleksanyan, V. T., and Sterin, Kh. Ye.

TITLE: Contact Transformations of Cyclodecane in the Presence of Platinized Charcoal

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 2, pp. 327 - 330

TEXT: The authors studied the following problem: Hitherto (Refs.1,2) it has been stated that cyclodecane on platinized charcoal is directly transformed into azulene. In connection with the $C_5$ dehydrocyclization (Ref.4) which has been discovered in the meantime, the question arose whether the formation of azulene is a secondary process, while decahydroazulene is formed in the main reaction (transannular $C_5$ dehydrocyclization) and yields azulene by dehydrogenation. To prove this reaction, cyclodecane was catalyzed on platinized charcoal (5 and 20% Pt)

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at 300 and 310°C and without tear gas. It was shown that the major part of cyclodecane is transformed. After rectification, the catalyzates were chromatographed on silica gel, and their Raman spectra were studied. The catalyzates proved to be complicated mixtures containing aromatic, paraffin, mono-, and bicyclic naphthene hydrocarbons. Naphthalene and o-diethyl benzene were found to be most important. Small amounts of α-methyl indan, n-butyl benzene, indan, and o-methyl benzene were detected. Approximately equal amounts of n-decane, cis-decahydroazulene, and 1,2-diethylcyclohexane, a small amount of trans-decalin. and a hydrocarbon of unknown spectrum were detected in the paraffin - naphthene part. The formation of decalin and naphthalene is obviously the result of transannular $C_6$ dehydrocyclization, while decahydroazulene is obtained from cyclodecane by $C_5$ dehydrocyclization. This indicates that $C_5$ and $C_6$ dehydrocyclizations are caused not only by the closure of open chains, but may also occur within a cycle while bicyclic systems are formed. Thus, n-decane can only have formed in the catalyzate by cleavage of the ten-membered cycle. Since hydrogenolysis has been

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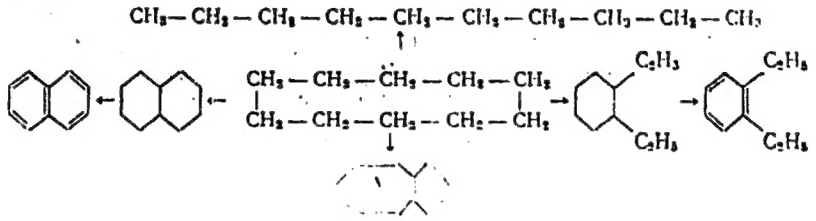
achieved only in cycles with no more than 5 hydrocarbon atoms, this observation is of fundamental importance. Hitherto, the formation of o-diethyl benzene and 1,2-diethyl cyclohexane has not been explained. It is pointed out that none of the traditional reactions can be used to explain this observation. The following reaction scheme is suggested for cyclodecane on platinized charcoal:



The remaining hydrocarbons detected in the catalyzate were probably formed by secondary transformations. There are 4 tables and 9 references: 6 Soviet, 2 US, and 1 Swiss.

Contact Transformations of Cyclodecane in the Presence of Platinized Charcoal

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ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova (Moscow State University imeni M.V. Lomonosov). Komissiya po spektroskopii Akademii nauk SSSR (Commission of Spectroscopy of the Academy of Sciences USSR). Institut organicheskoy khimii im. N.D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: July 28, 1960

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S/020/60/135/003/030/039
B016/B054

AUTHORS: Khromov, S. I., Balenkova, Ye. S., Lishenok, O. Ye., and Kazanskiy, B. A., Academician

TITLE: Catalytic Transformations of Cyclononane in the Presence of Platinized Charcoal

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 3, pp. 627 - 630

TEXT: The authors report on their experiments to clarify what transformations cyclononane undergoes on platinized charcoal at 300°C. They found that about 96% of cyclononane are transformed. They determined in the reaction products (approximately in %): indan 68, 1-methyl-2-ethyl benzene 22, n-propyl benzene 2, and n-nonane 7. The authors conclude from these results that two main processes take place: a) dehydrocyclization of cyclononane to hydrindane, and further dehydrogenation of the latter to indan; b) direct hydrogenolysis of the nine-membered ring to form n-nonane. The enclosed diagram illustrates the transformations mentioned. The authors explain the formation of n-propyl benzene and

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Catalytic Transformations of Cyclononane in the Presence of Platinized Charcoal

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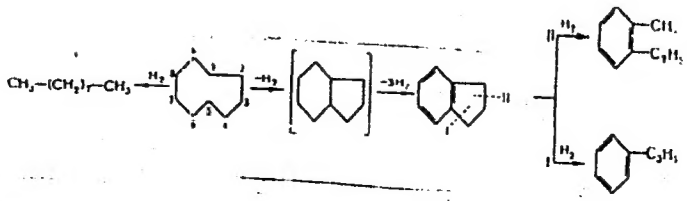
1-methyl-2-ethyl benzene by the following process: During the hydrogenolysis of the five-membered ring in indan, two C-C bonds are ruptured: 1) one separated from the benzene ring by another C atom, and 2) one adjacent to the benzene ring (the latter bond to a lower extent). The authors explain process a) by the formation of a new bond between $C_1$ and $C_5$ in the nine-membered ring, apparently due to the steric position of carbon atoms in the cyclononane molecule. There are 1 figure, 2 tables, and 11 references: 4 Soviet, 2 US, 1 French, 2 Swiss, and 1 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov)

SUBMITTED: July 28, 1960



Figure

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